Journal of the Royal Society of Arts

NO. 4898 FRIDAY, 1ST MAY, 1953 VOL. CI

FORTHCOMING MEETINGS

*MONDAY, 4TH MAY, AT 6 p.m. The second of three CANTOR LECTURES on "*The Novel*", entitled "*The Function of the Publisher*", by Michael Joseph.

WEDNESDAY, 6TH MAY, AT 2.30 p.m. "*The Great Seal of England, 1066 to 1953*", by Sir Hilary Jenkinson, C.B.E., LL.D., F.S.A., Deputy Keeper of the Records. the Right Honble. Sir Raymond Evershed, LL.D., F.S.A., Master of the Rolls, will preside.

*MONDAY, 11TH MAY, AT 6 p.m. The last of three CANTOR LECTURES on "*The Novel*", entitled "*The Bookseller and the Reading Public*", by Christina Foyle.

WEDNESDAY, 13TH MAY, AT 2.30 p.m. TRUEMAN WOOD LECTURE. "*Training for Science and Technology*", by Sir Richard Southwell, M.A., LL.D., D.Sc., F.R.S., Joint Secretary, British Association for the Advancement of Science. E. Munro Runtz, F.R.I.C.S., Chairman of the Council of the Society, will preside.

THURSDAY, 14TH MAY, AT 5.15 p.m. COMMONWEALTH SECTION. "*Cecil Rhodes*", by the Right Honble. Viscountess Milner. The Right Honble. Lord Altrincham, P.C., K.C.M.G., K.C.V.O., will preside. (Admission to this meeting is by reserved seat ticket only, and members of the audience are requested to be in their seats by 5.5 p.m. See special notice in the last issue of the *Journal*.)

* Fellows may reserve seats for this meeting if they wish.

FILM EVENING

The special uncut copy of *Louisiana Story*, which it was hoped to show at the Film Evening on March 6th, has now arrived in this country and arrangements have been made to show this at 7.30 p.m. on Wednesday, May 20th.

Fellows wishing to ensure a seat or seats (they are entitled to seats for themselves and two guests) are invited to apply to the Secretary beforehand.

"A NEW CHARTER FOR CHARITABLE TRUSTS"

A CONFERENCE ON THE NATHAN REPORT, MAY 19TH

The publication at the end of 1952 of the "Report of the Committee on the Law and Practice relating to Charitable Trusts" opened the door to important developments affecting voluntary activities of many kinds in this country, and created an opportunity for changes in legislation which may be of widespread benefit to the community.

In the light of this the Council has decided to convene a representative Conference to discuss the main implications of the Report before they are debated in the House of Lords, and to provide a forum for the expression of various points of view on this important and far-reaching question.

The Conference is to be held on the morning and afternoon of Tuesday, May 19th, at the Royal Society of Arts, and after an opening address by Lord Nathan the greater part of the day will be devoted to discussion of certain salient features of the Report.

As the essential purpose of the Conference is to gather as wide a range of informed opinion as possible, a large number of national organizations and individuals concerned with the subject of the Report have been invited. There may, however, be a few seats available in the Lecture Hall for Fellows desiring to attend and listen to the proceedings and, if it is desired, arrangements will be made for the discussion to be relayed to an overflow meeting. Fellows who would like to take advantage of this opportunity are asked to notify the Secretary not later than May 12th.

EXHIBITION OF COMPETITION DESIGNS

An exhibition of the winning and commended designs in the 1952 Industrial Art Bursaries Competition will be held in the Library from Monday, 11th May to Friday, 22nd May, 1953. The exhibition will be open to the public from 10 a.m. to 5.30 p.m.; Wednesdays to 6 p.m., and Saturday, 16th May, to 12.30 p.m. The Reports prepared by previous Bursary winners on the uses made of their Bursaries will be included in the exhibition.

THE CORFIELD INDIAN STAMP COLLECTION

Part of the legacy which, as reported in the *Journal* of 2nd May, 1952, was bequeathed to the Society by the late Miss D. W. Corfield consisted of the important collection of Indian stamps made by her father the late Wilmot Corfield, a Fellow of the Society. In accordance with a wish expressed in Miss Corfield's will, the Council of the Society has decided to keep this collection intact and it may be seen by Fellows who are interested on application to the Librarian.

INDUSTRIAL ART BURSARIES COMPETITIONS

1952 COMPETITION REPORT

The Report on the 1952 Industrial Art Bursaries Competition has now been published, together with the Particulars of the further Competition to be held in 1953, and copies may be obtained from the Secretary.

The publication begins with a Foreword by Sir Ernest Goodale, the Chairman of the Industrial Art Bursaries Board, in which he draws attention to the value of these Bursaries, both to the successful students and to industry itself, and refers to a recent review made by the Society of the subsequent careers of the winners of these Bursaries since 1946, from which it appears that the great majority have to-day obtained employment in their chosen career as industrial designers.

In addition to the list of awards, which was published in the *Journal* on the 6th March last, the Report also contains particulars of the tests set in each section, the reports and compositions of the Juries, and a summary of the uses made of Bursaries in 1952 by previous Bursary winners. A selection from the reproductions of successful designs contained in the Report is shown in the *Journal* on pages 388 to 393 and a table showing the growth of the Competitions since 1946 is reproduced on page 394.

ARRANGEMENTS FOR 1953 COMPETITION

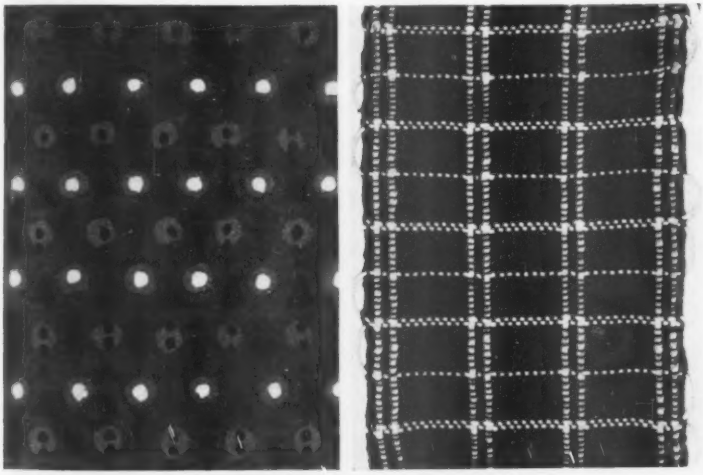
Details of the Competition to be held in 1953 are included in the second part of the Report/Particulars publication. One bursary of £150 will, unless otherwise stated, be offered in each of the following thirteen sections:

DOMESTIC ELECTRICAL APPLIANCES
ELECTRIC LIGHT FITTINGS
DOMESTIC GAS APPLIANCES
DOMESTIC SOLID-FUEL-BURNING APPLIANCES
CARPET
DRESS TEXTILES
MEN'S WEAR FABRICS
FURNISHING TEXTILES
P.V.C. PLASTICS SHEETING
PERSPEX
FOOTWEAR
FURNITURE
WALL-PAPER

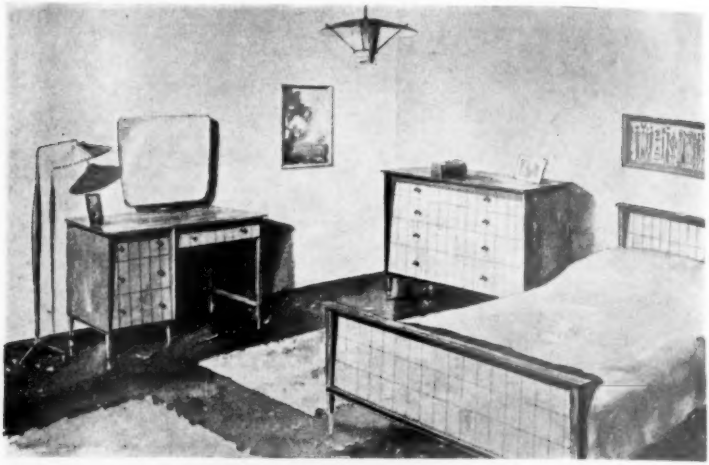
SOME OF THE DESIGNS

Axminster Coronation rugs, for the sitting-room of a small house, by Mr. Raymond Portman (top), Mr. Lawrence Avery (left), and Miss Ruby Mackie (right)

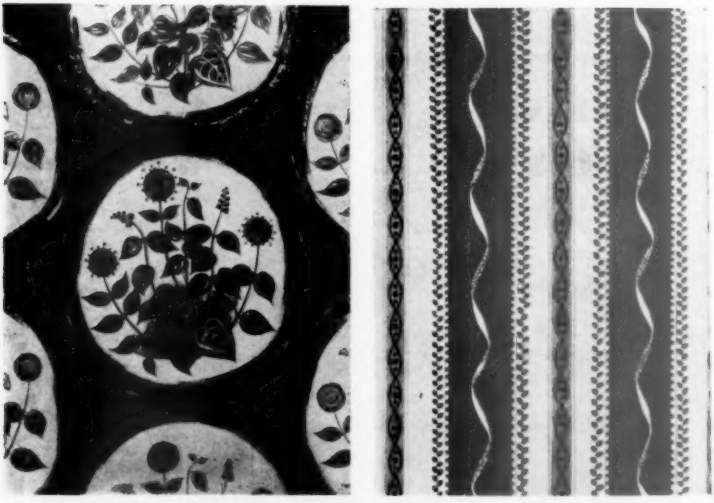
'Elegant' dress material of sheer silk, machine-printed in three colours, by Miss Ursula Marion White (actual size ; repeat $8\frac{3}{4}'' \times 4''$)



Left: Dress fabric in three colours on a coloured ground for machine-printing on foulard (actual size; repeat $4'' \times 4''$), by Miss Ann Hilton Cutbill. Right: Men's cotton and nylon sports shirt, by Miss Rhoda J. Hagg

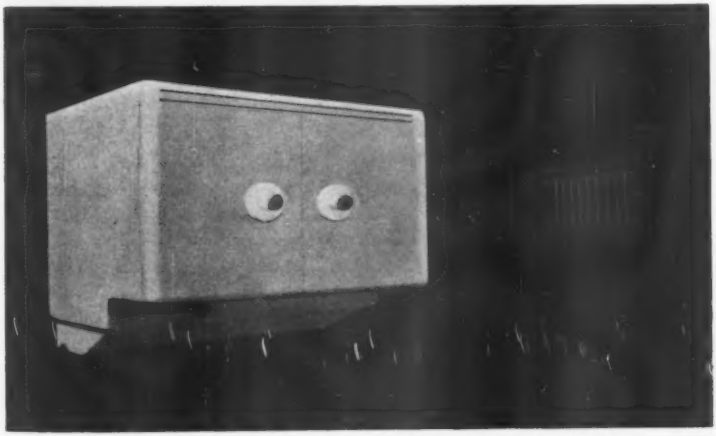


Bedroom furniture in African mahogany and ash, by Mr. Donald Raymond Pedel

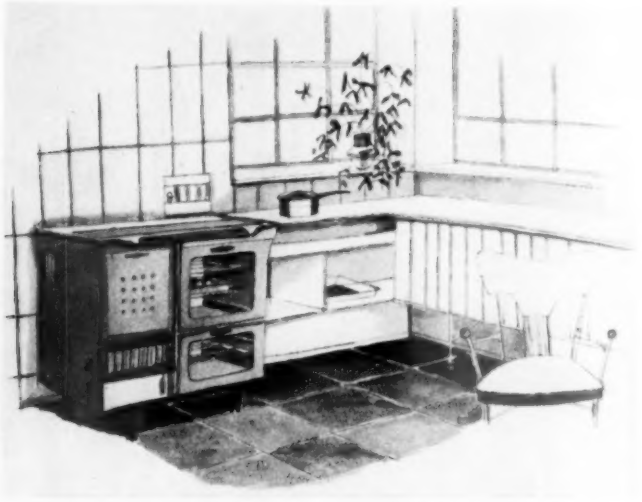


Left: Screen-printed linen in five colours on white for curtains and loose chair-covers for a drawing-room, by Mr. Michael McInerney. Right: A Jacquard-woven textile for curtains, for the dining-room of an eighteenth century house, in white, green-grey, olive-green, cerise: by Miss Mary Middleton

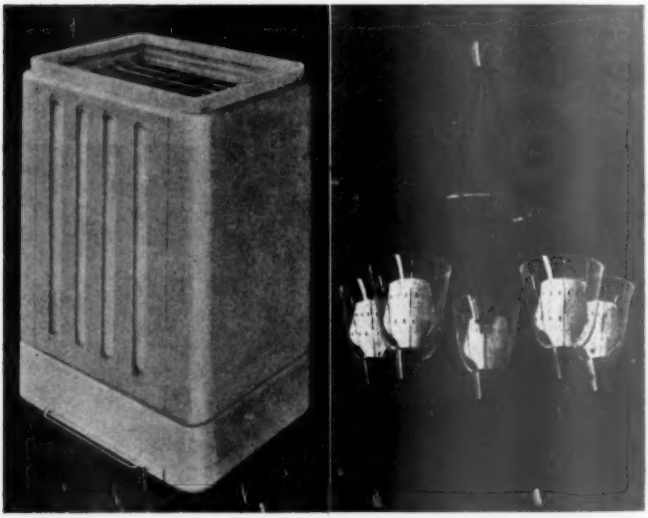
Top, left : Evening shoe in black velvet with moonstone clasp, and, right: Town shoe in dark grey suède and nylon mesh ; and, below (from left to right): Casual shoe in dark green suède and calf : girl's evening shoe in coral velvet : town shoe in black suède and patent leather and town boottee in ocelot and black suède, by Miss Gaybrielle Wilkins



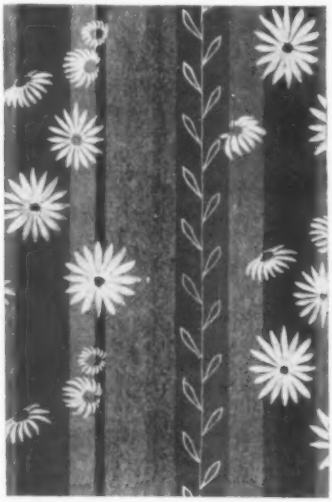
Gas-heated kitchen cupboard, by Mr. Colin Reginald Cheetham



Solid-fuel-burning appliance, to provide heating, cooking and hot water facilities, by Miss Josephine Ann Matthews



Left: Small electric clothes-drying appliance, by Mr. Geoffrey Gale. Right: Central light-fitting for a late Georgian house, by Mr. Leonard Summers



Left: Wall-paper, machine-printed in three colours, by Miss Kathleen Mary Veevers. Right: Wall-paper, machine-printed in five colours on a textured background, by Mr. Dennis Roger Limbrick. Both wall-papers are intended for the sitting-room of a small contemporary house

Sketch for a bathroom using decorative laminates; white for the walls, grey linette (behind the bath); with an original non-repeating abstract linear-pattern incorporated as a door-panel, by Mr. Roland Darnell Whiteside

ANALYSIS OF THE COMPETITION, 1946-1952

	1946	1947	1948	1949	1950	1951	1952
Number of Bursaries awarded	4	2	11	15	13	17	17
Value of Bursaries awarded	£500	£300	£1,400	£1,460	£1,705	£1,750	£2,225
Number of students	12	62	92	140	189	156	233
Number of schools	7	26	33	42	38	45	64
Number of sections	3	4	6	8	9	12	13

ANALYSIS OF ENTRIES IN EACH SECTION:

Note: The figures on the left indicate the number of students in each section; those in brackets indicate the number of schools.

SECTION	1946	1947	1948	1949	1950	1951	1952
Domestic Electrical Appliances	—	—	—	—	3 (2)	6 (3)	5 (4)
Electric Light Fittings	—	—	—	9 (5)	10 (4)	9 (5)	11 (6)
Domestic Gas Appliances	—	—	—	—	—	1 (1)	3 (2)
Domestic Solid-Fuel-Burning Appliances	—	6 (3)	4 (2)	6 (2)	9 (4)	3 (2)	8 (6)
Carpets	6 (2)	—	4 (3)	8 (5)	10 (3)	7 (4)	11 (5)
Dress Textiles	—	—	63 (24)	89 (30)	91 (28)	79 (28)	90 (34)
Men's Wear Fabrics	—	—	—	—	—	4 (3)	11 (8)
Furnishing Textiles	—	53 (23)	21 (14)	39 (14)	17 (11)	39 (20)	44 (25)
P.V.C. Plastics Sheeting	—	—	—	—	—	12 (5)	17 (6)
Laminated Plastics	—	—	—	—	—	5 (2)	7 (4)
Footwear	—	—	9 (4)	13 (7)	19 (10)	12 (5)	22 (9)
Wall-paper	—	15 (4)	—	19 (9)	23 (12)	33 (16)	32 (17)
Furniture	5 (3)	—	—	—	—	—	32 (14)
Leather Goods	—	0 (0)	3 (2)	8 (5)	—	—	—
Pottery	1 (1)	—	—	—	16 (5)	—	—

INCREASING BEEF AND MILK PRODUCTION

Two papers read at a meeting of the Society on Wednesday, 11th February, 1953, with the Right Honble. Earl of Radnor, K.C.V.O., a Vice-President of the Society, in the Chair

THE CHAIRMAN: This afternoon we have two papers, one on increasing beef production and the other on increasing milk production. Both are fairly closely allied subjects in that they are both concerned with increasing animal production from the land.

Now I think we ought to realize that in the year—nearly two hundred years ago now—that the Royal Society of Arts started, the predominant industry in this country was agriculture; and throughout the subsequent years, in spite of the Industrial Revolution, this Society has continued to take an active interest in the progress of agriculture, which, although other industries may loom large in people's minds, is still the greatest industry in this country. It has—I am almost inclined to say, fortunately—owing to the accident of the war, increased its interest in the eyes of our predominantly urban population, because upon the production of our home agriculture depends, even more particularly to-day, the size of the ration or the possibility of de-rationing any particular class of food.

This afternoon we are privileged to entertain and to hear, first of all, Mr. W. A. Stewart, who is the Principal of the Northamptonshire Institute of Agriculture. Any of you here who know anything about agriculture—and I am quite certain most of you know quite a lot about it—will know that the name of Mr. Stewart is one which is synonymous with a real knowledge, both theoretical and practical, of the science of feeding animals.

The following paper was then read:

I. INCREASING BEEF PRODUCTION

By W. A. STEWART, O.B.E., M.A., B.Sc.,
Principal, Northamptonshire Institute of Agriculture

On 19th January, 1763, James Boswell walked from one end of London to the other and dined at "Dolly's". He wrote in his diary that he ate "a jolly profusion of smoking, juicy beefsteaks". He added "I ate like a very Turk, or rather indeed, like a very John Bull whose supreme joy is good beef". These words of Boswell seem to me to summarize the Englishman's traditional feelings towards good beef.

Beef is defined as the flesh of the ox—a bovine, quadruped animal, domesticated and reared for food. Beef may, however, be the flesh of a cow that has spent several years in the dairy herd, or of a bull that has long been used for breeding. In the earlier days, much of it would be the tough product of work-oxen grown too old for the yoke, but in those cases it was not prime beef.

HISTORICAL BACKGROUND

Before the time of Townshend (1674–1738) and the development of his four-course rotation, there was little food available for cattle in winter.

Consequently, it was customary to slaughter, in November, those beasts which had put on sufficient flesh and fat on the summer grass.

Some of the November-killed beef would be eaten fresh, but the bulk of it was salted down for use throughout the winter. A continuous output of fresh, prime beef throughout the year depends upon a continuous supply of suitable foods and upon being able to fatten cattle at any season with some chance of profit.

The Industrial Revolution, and the increasing town populations, caused an ever-increasing demand for food in general, and for beef in particular. Stimulated by that demand, Bakewell (1725–1795) created his new breed of beef cattle, and other improvers, working upon local general purpose, or triple purpose, sorts, gradually developed them into specialized beef breeds. Breeding and feeding for beef, together with mixed farming, continued to form the background of British agriculture down to the 1870's. It was then that crop production was hit by the imports of cheap foreign grain. A decade later, beef began to arrive in England from the new countries overseas. From then onwards, home beef production continued a somewhat precarious, but not altogether unprofitable career down to 1939.

Throughout the last century and a half, the Smithfield Club has striven to improve beef cattle in conformation, early maturity and, latterly, carcass quality. A measure of the Club's success is the reduction in age of cattle in the youngest classes at Smithfield Show, from "under four years and three months" just over a century ago, to "under one year and three months" now.

UNITED KINGDOM SUPPLIES OF CARCASS MEAT AND OFFAL

Source	Pre-war (annual average)		1951		1952 (provisional)	
	Thousand tons	Percentage of total supplies	Thousand tons	Percentage of total supplies	Thousand tons	Percentage of total supplies
Argentina	436	21	87	6	110	7
Australia	195	9	67	5	34	2
Canada	7	—	—	—	24	2
New Zealand ..	257	12	275	19	324	21
United States ..	11	1	—	—	—	—
Other countries which suppled less than 5 per cent of total supplies	134	6	86	5	54	3
Total Imports ..	1,040	49	515	35	546	35
Home Production ..	1,063	51	941	65	1,009	65
Total supplies ..	2,103	100	1,456	100	1,555	100

Our economic position having changed radically, we can ill afford to import meat, and the world has less to sell. The foregoing table, taken from *The Times* of January 2nd, gives the figures relating to pre-war and recent supplies of meat. The pre-war quantity provided 100·9 lbs. per head per annum. In 1951 and 1952, individual consumption was 61 lbs. and 67·1 lbs. respectively. Under the recent agreement with Argentina, we are due to get 238,000 tons of meat in 1953. This amount, together with other imports and an estimated home production of 1,020,000 tons, may raise the amount available per head of the population to 75 lbs.

Pre-war, the home production of beef and veal was 605,000 tons. By 1942 the figure had fallen to 481,000. In 1950 it was up again to 604,000 tons.

It has been said that we cannot afford to return to the pre-war standard of beef consumption, that it is a luxury which our altered economic circumstances do not justify, but it seems to me much sounder policy to produce all the beef we can at home, rather than be obliged to buy from Argentina and pay on stiff terms with oil and coal. The terms of the recent Argentine Agreement reveal the degree of our need. It is not just that housewives are wistful about steaks. Leaders of industry recognize that more meat is necessary to keep industrial workers fit, and improve industrial production. Moreover, consumers are tired of lack of choice, and of the poor quality of much of the meat available. Consequently, there is everything in favour of increasing our home production of good quality beef, and it is indeed an urgent part of government policy.

The immediate objective is said to be an additional 150,000 tons of beef and veal, together with an increase in mutton and lamb. It has been suggested that the necessary extra food for the stock involved could be got from: (1) Another one million acres under the plough growing grain for food; (2) a five per cent increase in the yields of tillage crops; and (3) a fifteen per cent increase in output from grassland. Some feel that these suggestions do not go far enough, and that a fifty per cent increase in beef, or another 300,000 tons a year, should be the aim.

Let us examine just what such an increase would involve. In 1951, the number of cattle which passed through Collecting Centres for slaughter was just under two million, and they yielded something over 600,000 tons of beef: roughly three beasts per one ton of beef. Therefore, a 25 per cent increase means another 500,000 head of cattle for slaughter; a 50 per cent increase means one million additional cattle, or a total of three million cattle for slaughter annually. The first question which arises is, where are the store cattle to come from? Usually the answer given is, mostly from the herds and some from the hills. Well, I propose first to look to the hills.

CATTLE ON THE HILLS

There are in the United Kingdom some 16 million acres of rough grazing. A lot of it is carrying sheep, and I am not going to suggest that cattle should replace sheep, except on those grazings which may be over-stocked with sheep, and where a partial reduction of sheep in favour of cattle would be all to the good. Hill grazings are meanwhile carrying some 90,000 breeding cows. Allan Fraser

has estimated that the hills could carry 720,000 cows, but with a reduction in sheep. His arithmetic seems sound enough, but to protect sheep numbers, I suggest that maybe an increase of 360,000 cows would be the outside figure, in any case for the immediate future. From this number of cows, allowing for a percentage not in calf, and for replacements and casualties, it should be possible to reckon on 240,000 calves reared to weaning.

Of course, cows will not subsist all the year round on the keep on hill grazings. The pioneers of re-stocking are, however, substantially in agreement about what additional food each cow needs, mostly in the period from January to May. The figures which they quote are 7½ cwts. of hay, or 6 cwts. hay and 2 cwts. straw, or 7 cwts. unthreshed oats and straw, or one ton of silage per cow. In each case, the quantity concerned represents the produce of about one third of an acre of reasonably productive low ground. 360,000 additional cows, then, could be maintained on hill grazings, plus the produce of 120,000 acres of low land.

A hardy hill cow must be capable of living out the whole year. Cows, wholly or partly of Galloway, Highland or Welsh blood, and Irish Black Polls, have been favoured. The pure-bred cows are mostly crossed with Shorthorn or Hereford bulls; the crossbred cows with Shorthorn or Aberdeen-Angus bulls. The calves thus bred for beef, reared singly and sold off the hills in the autumn, are potentially capable of yielding high grade carcasses.

We owe a debt of gratitude to those pioneers who have initiated the re-stocking of the Glens. As far as I have seen, it is not romantic nonsense, but a sound proposition capable of extension and development.

CATTLE ON THE FOOT-HILLS

It seems to me that there is scope for much more rearing on farms with upland pastures and low ground leys and arable; conditions such as one finds notably on Speyside and in districts in Berwickshire, Northumberland, Yorkshire and parts of Wales. On those farms, particularly in Berwickshire, cattle are mostly kept in conjunction with sheep, and the breeding cows are relied on to maintain the pastures in the right condition for the ewe-flock. The grass, in winter, is supplemented with some oat straw and turnips or silage, with hay added after the cows calve. The cows are mainly Blue-Greys or other crosses, and mated to an Aberdeen-Angus bull. Many of the cows could, and some do, rear two calves. The limiting factor, in this case, is the supply of calves good enough to please the rearers, who are not very easily satisfied.

The calves may be carried on and finished for beef on the farms where bred, or sold at the autumn sales; in which case it is common to creep-feed them some time before the sale. The trough food improves their condition and enables them to go ahead better when the buyer gets them home. Altogether, the husbandry practised in Berwickshire in connection with this form of rearing achieves a high standard, and the efficiency of the calf sales at St. Boswells is on the same high plane. The result last autumn was an average price of £39 a head for 1,300 attested suckled calves sold on one day.

A variation of this method is to breed from two-year-old heifers, let them rear

a calf on grass, then live inexpensively through the next winter, mainly on roughage, fatten on grass the following summer, and go out as cow-heifers.

I estimate that at least 120,000 more calves could be reared in these ways.

CALVES FROM THE DAIRY HERDS

Now we come to calves from the dairy herds. In 1951 upwards of 1¼ million calves from the dairy herds were slaughtered at roughly four days old. A working party which examined this matter is reported to have reckoned that 16 per cent of these calves were capable of being reared to make tolerably good beef, and another 15 per cent capable of making "passable" beef—to keep on the safe side, let us say 300,000 calves worth rearing. And if Mr. Trehane could raise one million of his dairy cows on 30 gallons a piece, then enough extra milk would be produced to give the 300,000 calves 100 gallons each to start them out on life, without reducing the milk available for human consumption.

Many of these calves could, however, be reared by way of multiple suckling. This system has the advantage of coping with larger numbers and providing a bigger turnover than single suckling. A plan which works quite well is to have the nurse cows calving in October or during the winter, so that a cow can rear at least one set of calves by April. The spring grass then stimulates her milk and she carries on with a fair yield, completing her job on grass. On some farms the older calves can go out to grass in early summer, and this reduces costs. I reckon on a cow rearing an average of about five calves. I have, of course, seen ten and twelve calves reared per cow. It is certainly spectacular, but not specially economical. Moreover, mass production methods in calf rearing tend to give "hard doers", and not uncommonly lead eventually to outbreaks of disease.

There are certain snags to multiple suckling, such as the risks of scour and pneumonia in bought-in calves, which have not had the full benefit of their dam's colostrum. Modern methods of control of these diseases are, however, encouraging. The cost of labour and concentrates are also considerable items, and the standard of the calf at weaning depends chiefly upon how skilfully the milk has been supplemented. Actually the economy in the cost of rearing per calf, as compared with single suckling, is not as much as one might expect.

CALF SUBSIDY

The renewed calf subsidy should encourage the rearing of more calves for beef. Provided that the calves are reasonably well reared, the five pound subsidy per head will be paid on all beef-bred calves, also on steers of the dual purpose and dairy breeds, and on heifers of the dual purpose breeds which are suitable for breeding for beef, and which, after fattening, would be likely to yield carcasses of reasonably good beef. Heifers of the dairy breeds are not eligible for the subsidy. The interpretation of the rule with regard to dual purpose heifers, looks to me as if it might be open to a good deal of variation.

COW-BEEF AND VEAL

Mr. Willi Freund has drawn attention to the possibilities of veal production on summer milk. He has reminded us also that on the continent cow-beef and

veal form the chief sources of meat. It is, however, better quality cow-beef, because the cows are finished properly and reach a higher standard on slaughter. The best quality veal is obtained from calves fed upon an average of two gallons of milk per day, and killed at eight weeks old. They put on about 1·10 lbs. live-weight per gallon of milk. But in this country the price of veal is too low to make it worth while to use milk, even summer milk, for veal production. It pays better to sell the milk. It may be, however, that if milk production is stepped up, it may become desirable to use some part of the summer flush for veal production. Some price adjustment would, however, be necessary, and this seems to be a matter for the Ministry of Food and the Milk Marketing Board.

PROVISION OF FOOD FOR MORE CATTLE

If we can rear 660,000 more calves, it means that we should be increasing the total cattle population by over two million, as these calves have to be carried on until sold fat, and provision has to be made also for a proportion of their dams. As the existing cattle population is about 10¼ million, it involves a rise to upwards of 12¼ million, or an increase of 20 per cent. To feed the extra cattle, we would need roughly 20 per cent more food. At the outset I drew attention to an approved plan for increasing cattle feeding stuffs, but I doubt whether it would be sufficient. I fancy that we should have to increase output from grass, 20 or 25 per cent rather than 15 per cent. Certain grassland authorities maintain, however, that production from grass could be raised by 50 per cent. Now it may not be difficult to raise the output of a given field 50 per cent, but it is a different proposition with a whole farm. The limiting factor often is that we have to out-winter cattle on grassland, and out-wintering reduces the summer output. With more cattle this difficulty would be still further aggravated.

By conserving every bit of surplus grass in the form of hay, silage or dried grass, making every use of strip grazing when it is practicable, and increasing yields by the use of fertilizers, I feel that we could increase grass output by 20 or 25 per cent; and that, coupled with increased output from arable land, should enable us to feed the additional two million cattle. But we could not afford to waste. At the Farmers' Club in December, Mr. F. H. Turney said that in one county it is customary to cut the first growth on seeds leys, let the stuff lie until a second growth has come on, and then plough down the lot. He added that in the same county, 40,000 acres of sugar-beet tops are ploughed down annually. Well, our economic position is such that every bit of grass, every ounce of sugar-beet tops, and every morsel of every other food which is allowed to go to waste, is now needed to produce beef or mutton.

Another form of waste is in carrying on cattle, say from November to April, without any increase in weight, in order to enjoy higher prices. We can waste 150 daily maintenance rations on one beast—the equivalent of 1⅓ tons of hay. The Ministry of Food has doubtless to arrange differential prices in order to spread deliveries, but such a device is justified only as a temporary expedient. The modern answer is refrigeration; failing that it would really be more thrifty to revive the Elizabethan salt-tub.

Horns can be the cause of another sort of waste. De-horning saves space, food, casualties, and time.

FEEDING

Thirty odd years ago, the late Professor T. B. Wood devised standards of S.E. and P.E. for fattening cattle, and cattle need just about the amounts of starch and protein that Wood recommended. The bullock is, however, an accommodating animal, and provided we give time for the bacteria in his rumen to become adapted to any marked change of diet, he will fatten on a variety of rations. Normal-rate gains are got on a satisfying quantity of good grass or of good hay, and Professor Morrison found that 120 pounds of silage daily does equally well. Others have found that sugar-beet tops, along with some fibrous material and protein, can be quite effective. The Aberdeenshire feeder has long relied on turnips, straw, oats and some purchased protein for winter feeding. Perhaps that is the sort of ration which is the safest to handle, but even in the traditional turnip areas, kale and silage are now replacing turnips quite satisfactorily. My point is that we can produce beef on a wide range of different foods, but it is important to balance them correctly in order to ensure the most satisfactory results.

It is in this sort of connection that de-rationing of feeding stuffs will be specially helpful, as we shall have more freedom of choice, and will be able to follow a more elastic policy than under control.

The other point I wish to make is that in rearing, fish-meal is the most satisfactory food for supplying high quality protein and minerals that can be readily assimilated. In this respect fish-meal is effective in preventing certain deficiency diseases, and it would help greatly if supplies could be increased.

CONTROL OF DISEASES

The veterinary profession has made big strides in the control of certain diseases, particularly those diseases which have been long prevalent. It is disquieting, however, that new diseases appear from time to time. Fortunately, the vets seem to be on the winning side, and the important thing is that farmers should know just what can be done by way of disease control.

BETTER QUALITY BEEF

Earlier I said that consumers want better quality beef—more juicy steaks and less bone. We can supply better beef by feeding calves well at the outset; then "by keeping the calf flesh on them". If they are fed sufficiently well in the first winter after weaning, and are not allowed to lose their calf flesh, they can pretty well take care of themselves after that. It makes a lot of difference, however, whether they are beef-bred or beef crosses. At Smithfield Show this year, an Aberdeen-Angus-Dairy-shorthorn first cross heifer, which won her class, weighed 8 cwts. 12 lbs. at 11 months 2 weeks. Another heifer of this cross won third prize as a carcass at 14 months 2 weeks old. This shows the possibilities in the way of early maturity, and carcass quality in first crosses got by a beef bull and out of dairy cows. Up to now, we have not used bulls of the beef breeds as fully

as we might. Perhaps the calf subsidy will now encourage more commercial dairy farmers to use a thick fleshy, beef bull, with plenty of substance, for crossing with low yielders and first calf heifers. The artificial insemination service can co-operate.

As regards the marketing of fat cattle, I favour payment on the basis of quality and dead weight. High-quality cattle have had "the wrong end of the stick" too long. A case in point: a second-prize carcass steer from Moulton, at last Smithfield Show, yielded a percentage of 67·87. If he had been sold through the local centre and graded S.S. (59 per cent), the Ministry of Food would have got 95 lbs. of beef for nothing. But I do not want to be misunderstood. Quality means a lot more than just killing-out percentage. The high quality carcass has a higher proportion of first-class cuts, less waste and less bone, and provides more attractive beef. Present-day taste dislikes fat. And my experience as an exhibitor of carcass cattle indicates that length of body gives both a high carcass percentage and lean meat. An analogy is the long, lean, bacon pig compared with the short, fat, porky pig.

SUMMARY

I do not profess to be a statistician and my figures may not be correct—perhaps too high, perhaps too low—but I hope the figures will serve to illustrate the enormous scope for greater production. My submission is that in the United Kingdom, we can raise and feed enough cattle to provide an extra 660,000 head for slaughter annually. This number should yield some 220,000 tons of beef. This quantity, with additions due to improvements in breeding, feeding and finishing, together with increased veal production, should be just about equivalent to the 238,000 tons of imported Argentine meat.

To achieve this objective, it means the complete elimination of waste, and the full use and development of all our resources. It would require more labour, and particularly more stockmen. In this connection, a place like Moulton can help. Part of its job is to preserve the well-tried skills, stimulate keenness about about livestock, and teach the more practical scientific aids.

A vast amount of extra capital would be needed for investment in cattle, buildings, cottages, and a whole range of equipment. In this respect, certain existing government schemes assist materially, but I am afraid the objective cannot be achieved simply on the basis of fixed prices and guaranteed markets. Other incentives will be necessary. I will not attempt to define these, but I fancy that if some means could be devised, whereby farmers could more readily build up capital for the development of their enterprises, it would go a long way towards solving this and other problems of production.

THE CHAIRMAN: Now I will ask Mr. Trehane to give the complementary talk on the question of increasing milk production. Mr. Trehane is Vice-Chairman of the Milk Marketing Board, and must therefore have very considerable knowledge on the whole subject of increasing milk production, and milk production generally. I would say this of him, that his name is well known in the county of Dorset, which is the second-best county in England; it is next to Wiltshire, where I live. And I may say that he

has followed very worthily indeed in the footsteps of his father, who was himself a member of the Milk Marketing Board for a great number of years, and whom I was proud to know, rather better, in fact, than I know his son.

The following paper was then read:

II. INCREASING MILK PRODUCTION

By W. R. TREHANE,
Vice-Chairman, Milk Marketing Board

Within the big subject contained in the title for my paper I propose to select and put before you a few of the issues which seem to me fundamental, not merely from the point of view of those who are actively engaged in the dairy industry, but from the national standpoint. Milk production is the most important single branch of farming, and as much as one-third of the total value of the agricultural output of this country is attributable to the production of milk and milk products. The dairy industry, in which dairy farmers, distributors, manufacturers and others combine to provide the nation with milk and dairy produce is a major economic activity in which I dare say more than half a million persons are involved in one way or another.

The total quantity of milk in liquid form and in the form of dairy products which is used by the fifty million consumers in our highly urbanized community is a figure of nearly 4,000 million gallons annually. Our own agricultural resources cannot possibly provide it all, and last year, when consumption of some milk products, particularly butter, was severely restricted, the output of milk from our dairy farms was only 47 per cent of the total volume of equivalent milk consumed. There are, fortunately, now no restrictions on the consumption of milk in liquid form, except some slight shortage in September, and we can satisfy the whole of the liquid market from home resources. The little which remains of our own milk—14 per cent of the total output—helps in a small way the vast quantities of milk products, mainly butter and cheese, which we import from overseas.

THE MARKET FOR MILK

I emphasize the vastness and the importance of the market because it is fundamental to my theme. The structure and the extent of dairy farming in this country is determined directly by the nature of our market for milk and dairy produce. The amount of milk people consume at prices and incomes prevailing, the kind of milk they want, the occasions for which they require milk and its derivatives—all these affect the size, the shape, the changes and developments of our milk producing industry. The market is not static, of course. We need only to look at the changes which have occurred in the last ten years to realize that they can be both rapid and unexpected, temporarily outpacing the adaptability of the producing side of the industry. At the present time, the average consumer in this country consumes nearly $\frac{3}{4}$ pint of liquid milk daily;

ten years ago he took less than ¼ pint. Even at the present level of our butter and cheese rations the total quantity of milk and dairy produce now being consumed in terms of milk solids is much greater than it was before the war.

We can be quite certain that the market for milk will go on changing, in response to general economic movements, to changing food habits, to the discovery of new processes and new techniques. There are already interesting developments in the United States and Canada, where some believe that the standard of butter fat content by which milk has been judged is being replaced by increasing emphasis on the protein and milk solids content of milk. The scientists concerned with food and nutrition can have the satisfaction of knowing that the public is taking notice of their findings and advice. There are reports of falling butter consumption throughout North America, and the very changes which wartime shortages induced here in the manufacture and content of ice cream, for example, are now occurring, for quite different reasons, in the United States, where the dairy industry is alarmed at the substitution of vegetable fats for butterfat. I do not say that these market developments will reproduce themselves exactly over here; I do say, however, that there will be changes, and that it is important that British dairy farmers and the whole of the dairy industry should be aware of them. Indeed, our first task in dairy farming in this country is to look at the market, study its requirements, the changes that take place, and fashion the producing side of our industry continually to suit it.

BRITISH DAIRY FARMING

In fact, sudden market movements of the past ten years have been accompanied by a considerable change and a great development in British dairy farming. Let me say, however, at this stage that it is fallacious to talk of dairy farming here as if it were a neat and homogeneous section of the agricultural industry. In fact, production of milk for sale is carried out on a large number of scattered holdings of various type and size. There are the specialist dairy farms, producing their milk largely from grass, or from arable crops. On other holdings milk is merely one of the products of mixed farming practice. There is an infinite variety and degree of intensity and specialization and this is not merely, as a New Zealand critic has told us, a habit of mixed farming and muddled thinking on our part; much of it is the result of wide differences in production conditions and market opportunities, some of it even the result of government policy.

On the whole, however, there has been a tendency in the past ten years for specialization in dairying to increase. Wartime conditions produced a demand for cereals and for milk, and this was the predominant feature of agricultural policy at any rate up to two or three years ago. In these circumstances, the number of holdings in England and Wales producing milk for sale expanded by nearly 20 per cent in the decade following 1939, and, in the same period, the total output of milk rose from 1,119 million gallons to 1,530 million gallons—a net increase of 411 millions. The beef and dual purpose breeds have in many herds been replaced by the dairy breeds and the yield per cow all over the country has risen by 80 gallons on average in the past twelve years, to a figure now estimated at

640 gallons per cow. This great increase in milk production has been obtained with only a small increase in the total national herd. The improvement in the yield of the cow has been the main factor.

DEVELOPMENTS IN TECHNIQUE

These developments have been accompanied by changes in technique which both have been the result of—and have also made easier—the process of specialization, particularly on our smaller farms. I do not want to describe these in detail. The technique of breeding cattle, for instance, has been revolutionized by the rapid spread of the use of artificial insemination; one third of the animals of breeding age in this country are now bred artificially. This service of better bulls is now easily available to all our small producers. Again, some 53 per cent of all the farms producing milk for sale now use a milking machine, which must be nearly universal on the specialist dairy farms. The substitution of home grown for purchased feeding-stuffs is in itself part of the specialization process; the whole of the economy of the farm is attuned to the production of milk. We estimate that 80 per cent of the nutrients required by the dairy cow are now grown on the dairy farms.

Technically, there would seem to be still ample scope for further development. On the breeding side, although it is true that artificial insemination is widely used among dairy herds and has already demonstrated the economic benefits to be derived from it, we have as yet barely begun to see what effect the use of first-class breeding animals can have on the physical output of milk, provided that the management of our herds improves to meet the higher potential of production. This is a long term policy, but the foundations are being laid for higher output of milk which, granted the economic incentives, will appear in the years ahead.

Although the milk recording movement is now much stronger than it was before the war, only one producer in four records the yields of his cows officially. Milk recording is the basis for improved breeding in our industry, and it is important that it should be more widely adopted. The yields of all milk-recorded herds are more than a hundred gallons a cow above the general level. The range in yields even in recorded herds is considerable, and the higher figures show clearly the results that can be achieved by a combination of careful breeding with good management.

Grassland is the foundation for our herds in this country, and it is generally admitted that the output of grass for all purposes can be easily and economically increased.

I would say also that we have still to come to grips with the problem of dissemination of information to dairy farmers. I know that we have a National Agricultural Advisory Service provided by the State. Admirable work is being done by the Service, and I do not wish to criticize what has already been achieved. I suggest, however, that it has not gone nearly far enough, and it cannot compare, on the dairying side at any rate, with the practical work, for instance, of the United States Farm Extension Service, or with the advisory work now being carried out among dairy farmers in New Zealand.

MILK *versus* OTHER AGRICULTURAL PRODUCTS

I wish to emphasize that our dairy farmers have in the past ten years or so made very considerable progress, both in terms of output and efficiency. But, technically, as I have said, opportunities for development appear still to be considerable; economically, however, the position may not be so easy to foretell. In the past two or three years there has been a tendency—not confined to this country alone, perhaps—for government price policies to give greater incentive to other agricultural products, and meat in particular. In this country the argument has been used that milk output is now sufficient to meet the demands of the liquid milk market and that increasing the output of meat is now more important. The official view appears to be that a choice has to be made; once the liquid milk market is supplied, agricultural resources are better devoted to the production of beef than to the supply of more dairy produce. I do not accept this view. I do not believe that an additional supply of meat and greater supplies of dairy produce are necessarily incompatible. I have already referred to the multiplicity of types of dairy farms in this country. Many of these can grow meat as well as milk, and they can produce more of both. And this should be the policy to be encouraged, rather than a switch from one product to another, which is a very difficult process in farming, particularly in milk where a great deal of fixed capital is involved. I am well aware of the need for more meat, and I do not believe that more dairy cows are necessary. But it is important from every standpoint that capital and labour resources on dairy farms should be fully utilized for maximum production of milk. The prospects for increased output on these farms are favourable, and farmers should be encouraged to exploit them fully in the interests of a greater food supply.

I can see no reason why a bigger beef industry should not be developed on the foundation of, or as ancillary to, the dairy farming industry. The subsidies for calf rearing, I believe, will stimulate this development. The small dairy farmer will rear more calves, and these should provide a greater supply of store cattle to the beef producing farmers. These two branches of our industry must in many areas be complementary if we are to achieve maximum output of food from the great variety of our agricultural holdings.

THE EXPANSION OF MILK OUTPUT

While I am satisfied that our milk producers must regard the liquid market as the most important outlet for their supplies, there is ample scope in this country for a thriving milk products industry. A great deal of capital is invested in this side of the industry and a greater supply of milk is required to use it fruitfully. We will continue to rely on dairy farmers overseas to supply us with the greater part of our butter and much of our cheese. But there is still a very substantial market here for British cheese as well as for fresh cream and condensed and dried milk. In these respects we can compete successfully with overseas producers. Consumers are in danger of forgetting our British cheese, because all our produce now goes unnamed on the ration. I should like to see a bigger and

more virile British cheese industry and we could produce the milk for it economically.

You will observe that I am advocating a policy of expansion—expansion which we are technically capable of supporting and which we can justify also on economic grounds. A bigger output of milk obtained without increasing cow numbers but by better breeding and better management of the herds coupled with much improvement in our grasslands will improve the economy of dairy farms and add to our food supply.

The other problem which I think we must solve concerns the collective organization of farmers. In some countries, a solution to this problem is found, apparently with ease, by voluntary co-operation. We have never found this kind of arrangement very successful in this country. We of the Milk Marketing Board believe we have found a solution to the problem of giving to dairy farmers the benefits which can be derived from collective organization without interfering unduly with them. This, indeed, must be the framework within which the expansionist policy I have advocated can be satisfactorily pursued. Our dairy industry must remain a big part of our agriculture. We need much more milk; it needs to be produced economically, and marketed well. These two objectives can be achieved through the producers' own organization—and to give more freedom and scope to the producers' board may be the first requirement of further substantial progress in the industry.

DISCUSSION

MR. T. H. TURNEY: Mr. Trehane says he does not want more cows. I presume he is overlooking the 200,000 Mr. Stewart wants on the hills, and the 120,000 more on the foothills. Mr. Stewart has shown how the extra calves could be produced and fed in the early stages, but he skated rather lightly over the wintering of these cattle. There was a time when Norfolk men filled their straw yards with cattle; now they do not. Mr. Stewart admits that cattle walking about good pastures do a lot of harm and reduce production next spring and summer. I am not happy about where the extra cattle are going to be kept, particularly those in their first year. They certainly want a comfortable home, and Mr. Stewart has not found a place to put them. Can he persuade the Eastern County farmers to put a lot into their yards again?

I am not sure about the economics of producing these calves. We produce cows, some by suckling and some by bucket rearing (we are mainly dairy people) and they both do very well. In large herds it is an advantage to have some on bucket rearing. In the large herds you may have two or three cows calving each week from September till February; they give two or three days' milk that cannot be put into the churn, and that can help in feeding quite a number of calves. But even allowing for that, and rearing my calves quite well, I cannot get them to six months much under £20 each; and I cannot get them through the next six months under another £15 each. It is an expensive business. Perhaps Mr. Stewart can indicate how to solve some of these problems.

MR. W. A. STEWART: The first point that Mr. Turney raised was homes for the young cattle in their first winter; and I agree that it is very important. Might I suggest that one way of making the existing homes go further would be to take all the horns off these young cattle to start with. Then the existing accommodation will go very much further. I think that most certainly ought to be done.

I agree with Mr. Turney that the youngsters in the first winter do need housing if possible. There must be many yards throughout the country that are not being fully utilized. Mr. Turney himself has referred elsewhere to the very large quantities of sugar beet tops which are not being used in counties where they used to feed cattle; and I think there must be accommodation there for quite a lot of young cattle. But at the same time I have no doubt that if this extra number of young cattle are to be kept, it will involve more housing. That was one of the things I mentioned that would be necessary and that would need more capital. I think that the important point we come to again is that farmers (and landlords also) should have the means of increasing capital so that they can devote more of it to the provision of more housing.

With regard to Mr. Turney's costs of £20 in the first six months and £15 in the next six months—£35 in the first year—I think that is a little too high. I feel that if Mr. Turney will look into his costs, they will not come to quite so much as that. But at the same time it does raise the question of the comparative costs of single rearing as compared with multiple suckling: there may not be as much difference as we have been accustomed to think.

MR. FRANK H. GARNER: I should like to ask several questions. One is with regard to the possibility of advising farmers to develop cow-heifer production. I have tried it, and I have found from my own experience that if you have to breed at a young age to get the heifers calved and away fat before they lose their teeth, you may produce a race of smaller calves.

The other problem is the great difficulty of selling the cow-heifers themselves fat before they have lost all their teeth; if you miss the bus you lose £20 per beast. That is a very serious proposition. I think we would do far better to depend upon dairy herds to provide us with stock for fattening for beef production.

We have heard from Mr. Trehane that in future we shall need less replacements in our dairy herds in this country. Would it not be a very easy way of increasing the beef-producing stock of this country for the Milk Marketing Board to advocate that Friesian heifers mated for the first time be mated with beef bulls? Half the progeny (the steers) will in any event be better for beef production, and you do not know which, if any, of the heifer calves you want to retain until you know how satisfactory the dams are for milk production. Consequently neither the farmer nor the country are going to lose much in the way of milk production if all calves from the heifers' first calving are crossed for beef production. Some might even advocate the same policy for the Ayrshire breed, although I am not prepared to do so myself.

To return to Mr. Stewart; he suggested that fish-meal might be used in greater quantities for cattle. I personally am very surprised to find him making this suggestion, because just recently I have had the greatest difficulty in getting sufficient fish-meal for pigs; and he is a pig-keeper, and must have had the same trouble too. I feel that a better line of approach would be to produce more silage for stock, particularly for the younger calves and the young stock in general. I feel that that is a better proposition than to suggest that fish-meal should go to the calves and not to the pigs.

Now here is a matter for both speakers: the question of husk. One of the biggest problems facing the cattle industry in this country at the present time is husk. We advocate manuring of grass. That in turn means heavier stocking of grassland to cut the extra growth of grass after it has been heavily manured; and that leads to husk troubles in some seasons in many districts. I feel that we want more information from the veterinary people on the treatment of stock that has got husk; more information on management, how to avoid getting husk at all, and also, if possible, on the treatment of infested pasture land after husk is there.

MR. W. A. STEWART: With regard to cow-heifers, I realize Mr. Garner's difficulty. But if you can get two-year-old heifers, well grown, producing calves and suckling them throughout the summer, then weaning the calves in the autumn, doing the

heifers well enough the next winter—I do not think any concentrates are necessary; they can be fed on silage as Mr. Garner suggests, and hay, straw and whatever home-produced food may be available—it is possible to get them out fat the following summer before they lose all their teeth. It takes a bit of doing, but it can be done, provided they are well grown as two-year-olds and provided they are reasonably well-bred; preferably, I think, if they are crosses by beef bulls, or a really fleshy sort of dual purpose heifers.

The other point Mr. Garner mentioned, that I referred to, was fish-meal. I think that fish-meal is almost invaluable in supplementing the feeding of calves that have to do with a limited quantity of milk, as part of their concentrated ration. I do not think there is anything quite to replace fish-meal for that purpose. The point I wanted to make there was that we need more supplies of fish-meal. I think this is really a matter for government policy. There are small towns and villages in the north-east of Scotland which are becoming more or less derelict as fishing centres, and it seems that something will have to be done to revive industry there. I feel that the two things might be linked, and that we might be able to get more fish-meal from the rejuvenation of some of these small fishing towns in the north-east of Scotland. I agree that in the case of pigs, but also in the case of cattle, or any class of stock you like, fish-meal is the stuff.

With regard to husk, I should like to make one observation, because like Mr. Garner I have had trouble with this. A thing which I think is not very fully realized is that calves can pick up husk very readily in May, when they go out to grass. If calves begin coughing just about the first week of July (about the week of the Royal Show!), you can take it they have most probably picked up husk while going out to grass in May. That is the time we have to take care. House them at night and do them well if they go out at the beginning of May. With regard to autumn husk, there is nothing that I can say apart from what is generally well recognized. But the picking up of husk in May is a thing which I think we might look out for rather more than we do.

MR. W. R. TREHANE: I am not surprised that Mr. Garner picked up the point I made about needing fewer dairy replacements, and prodded me a little with my own stick on that one. As you know, Insemination Centres do hold studs of beef bulls, and the use of those is open to any dairy farmer who wants them. We have not, frankly, had a big campaign advocating their use. The reason for that, and the reason why we shall probably not have that now, is that we feel that in these questions timing is all-important. It would be no use for me to say to dairy farmers, "We believe that in two years' time (or however long it may be) you will have difficulty in selling your surplus heifers; you'd better start using a beef bull now." I think that sort of warning, or that sort of campaign, would largely be disregarded. But the moment the dairy farmer finds that it may be difficult to get a good price for his surplus dairy females, he will be the first person to make full use of these beef-bred bulls. If and when that occurs, then Mr. Garner's second point, of using, say, an Aberdeen-Angus on dairy heifers, will no doubt be extensively practised by farmers, if only to reduce the risks of calving; and that will be an indirect benefit to the dairy industry. The only difficulty we have there, in regard to tying up with artificial insemination, is that it is not so easy for a farmer to use insemination with the heifers, as they are often at a distance from his buildings and are not seen as frequently as his cows.

So it may be that the breeder of young Aberdeen-Angus bulls will get the benefit of being able to supply more bulls for that sort of purpose. But, make no mistake about it: as soon as the time is here when we know that fewer replacements are necessary, and we can say so knowing that it will be well received, we shall quite properly and gladly advocate this policy.

As to husk, I have very little to add to what Mr. Stewart has said, except this. We

are perhaps a little more conscious of husk at the present time than we would be normally, because of those two very wet summers of 1950 and 1951. I have no doubt that that has built up a big concentration of the worm, which is very likely abnormal.

MR. GEORGE SPRINGALL: At the end of his paper Mr. Stewart referred to the fact that he did not believe that expanded beef production could be obtained under the present system of guaranteed prices and assured markets. He said that he leaves the alternatives to us. I wonder if he would like to make a further comment?

MR. W. A. STEWART: I do not think I went quite so far as to say that we would not get the expansion. I said I was afraid we might not get all of it. Well, I put it to you, shall we? There is this need for so much more capital if we are going to expand under the existing system. I am no expert on this; I know no more about it, probably less, than many people in this room. At the same time we know the difficulty of building up capital for expansion in agriculture at the present time. If we have got to expand to keep cattle in sufficient numbers to slaughter 660,000 more annually, it does mean a great deal more capital; and I feel that the incentive to keep those cattle must be greater than it is at the present time. I think one incentive that would help very much would be if farmers could be shown some means of building up that capital to do the job. I feel that that, really, is at the bottom of the whole business. We know how these cattle could be increased. We know they could be kept, perhaps not in the numbers I mentioned, but not far off them, under these conditions, on the hills and on the foothills, and that calves from the dairy herds could be reared and fed. I am pretty certain that they could be reared if we produced all that we can produce and if we eliminated waste. But will we do it until farmers can see their way to build up their capital? That really is the point I put to you. I am rather afraid we shall not.

DR. JOHN HAMMOND, C.B.E., F.R.S.: I should like to add something to that. I do not think we should ever have got this increased production in milk that we have seen over the last ten years simply by guaranteeing prices. There was all the technical development behind it which a board, the Milk Marketing Board, has been able to do.

I think Mr. Trehane said that we want something more than an Advisory Service, or at least we want an Advisory Service on a commodity basis. Too much, I think, in the past our advisers have been scientists first and technicians afterwards, that is, they have been specialized in a science rather than in a commodity. What we must do is to synthesize scientific knowledge on a practical basis. That is really one of the ways in which the Milk Marketing Board has been able to achieve this spectacular milk development, in that they have synthesized scientific progress and produced such practical things as artificial insemination, grass-drying and so on, and made it available to farmers.

I cannot help thinking that that is the solution of the beef problem. We have the knowledge on the beef side, but we have no specialist advisers on beef in the Advisory Service. There are many things which a Meat Marketing Board could do to help technically. As you may know, the farmers have put out a scheme for meat marketing. I am very sorry indeed to see that they have not stressed this other point that, beside marketing, there was the whole aspect of the technical side of production which is so important in getting our beef supply.

MR. A. S. FOOT: There is one aspect of this problem of meat and milk production which neither speaker has discussed this afternoon, perhaps a little surprisingly. That is the relative output of human food which one can get from an acre of land in the form of meat or in the form of milk and milk products. Now as far as I can understand, an acre of land, whether you look upon it in terms of dry matter or protein for the human being, will produce something of the order of three times as much in terms of milk as in terms of meat. I wonder if either of the speakers, or preferably both the speakers, would care to give us their views as to the point in history, or the

circumstances, which should divert acreage from milk on to meat; acreage which in a good many cases, after all, can be used for both purposes.

There is one question I should like to ask Mr. Stewart: it concerns the feeding of the steer calf in the dairy farmer's herd. I am quite sure that in the last year or two many dairy farmers have become quite conscience-stricken in turning away a steer calf for slaughter as a young animal, when they knew it might become a good beef animal. But I think the great difficulty they are up against is that many of these steer calves are autumn or winter born; and they will have to feed that animal on something like a gallon of milk a day for a substantial period. The cost of a gallon of milk is something of the order of 3*s*. 6*d*. or 4*s*., and when they tot up the total amount of money they will lose off their milk cheque, they will come to the conclusion that they cannot do it. I should like to know what Mr. Stewart's views are on the possibilities of recommending, perhaps on a national basis, a milk replacement food for these steer calves, which could then be raised at a very much lower price. As far as I can gather, there is experimental evidence to indicate that one could cut one's milk consumption for the calf down to a very low figure, perhaps ten or twenty gallons instead of the eighty or a hundred which he mentioned, if one is prepared to accept a live-weight gain of perhaps a pound and a half a calf a day. Does he think that is enough eventually to produce a good beef animal, or is that asking the impossible?

MR. W. R. TREHANE: My own attitude to Mr. Foot's first question, as to whether you should devote your acre to meat or to milk in view of the difference in economics of the two jobs, is really very simple. It depends on your attitude. Mine is that of a practical business man. I say that you will decide entirely in terms of your market. I do not believe that the time is now appropriate, getting on towards the middle of the nineteen-fifties, when we should continue to be dominated in our policy by quite such theoretical considerations as Mr. Foot has mentioned. Let us get back to realities. What the public wants, what the public is prepared to pay for, they shall have.

MR. W. A. STEWART: I think what the public wants is good beef, to supplement the milk they have had for a long time.

Now coming to realities, with regard to Mr. Foot's question, I realize this difficulty of the dairy farmer who is selling milk and, at the same time, feels that he ought to rear steers. But Mr. Foot's neighbour is actually rearing his steer calves and has been doing so without using an excessive quantity of milk.

At the same time, I am not very keen on these milk substitutes. I have always favoured a drop of good milk for calves. I think it is equally as necessary for calves as for human beings in rearing; and that goes for the dairy heifer calf as well as for the steer calf. I think we can be too economical sometimes in trying to do with too little milk. I realize also that some of these milk replacement foods are used quite successfully, mostly by women. I think that generally speaking one finds that on farms it is women who can use these replacement foods much more successfully than men; you find that all over the country. If the job has to be done as part of the farming job by a cowman who is busy producing milk as well, then it is much easier to let him use new milk.

I do not know that you can really say that you can charge it up at 3*s*. 6*d*. or 4*s*. a gallon; I do not think that is quite fair. I advocate using a reasonable quantity of milk. In fact, with our own dairy heifer calves we are in the habit of using somewhere about eighty gallons of milk. It pays us to do so because it cuts down expenditure on concentrates later on. I think the same applies to the steer. If you have got the milk and can use it, it will cut down expenditure on feeding later on if he gets a good start on milk. If we are getting near saturation point in milk, or if we pass saturation point, then I think the thing to do is to use a portion of the milk to rear these steer calves. I would be quite happy with about a pound and a half daily increase or even less, that is perfectly all right. But it is a question of whether the calf gets just that sufficient

start in life to lay on flesh and develop the parts that we want to develop, so that the beast is going to finish a reasonably good carcass later on. That is the important point.

THE CHAIRMAN: We have had two extraordinarily interesting papers, and a very interesting discussion; and perhaps if I take the Chairman's privilege of making one or two brief comments without expecting a reply, you will forgive me.

I found them interesting from this point of view. Both were aimed at the question of increased production. On the question of milk, Mr. Trehane fundamentally was arguing for increased production with the same number of animals. Mr. Stewart was aiming at increased production and a greater number of animals. I should comment that he wanted his increased production either from the hills or the foothills or the dairy farms. I know a great number of people aim at increased production in farming in this country from the hills. I spent most of last week on the hills of Central Wales, round about the 1,000-foot contour mark or even higher, and it was infernally cold. Animals may be able to live there, but I am pretty certain human beings will not like to; and you must have human beings to look after the animals.

I would add one more point to Mr. Trehane's Parthian shot on the subject of co-operation. I have had quite a lot to do with co-operation in my life. I am an older man, I hope a little wiser, certainly a great deal poorer, as a result of my interest in co-operation amongst farmers and land-owners. But I would suggest to him that the Milk Marketing Board is a peculiar British form of co-operation which you might call "voluntary-compulsory." We voted ourselves into the Milk Marketing Board, and the Milk Marketing Board has become our extremely successful and efficient master, as the figures that Mr. Trehane gave us have shown.

A vote of thanks to the lecturers was carried with acclamation and the meeting then ended.

GENERAL NOTES

THE PHYSICAL SOCIETY'S EXHIBITION

The Physical Society held its 37th Annual Exhibition from 13th to 17th April, at the Imperial College, traditional home of this firmly established and well-patronized event. The majority of the 134 exhibitors were manufacturers with a leaven of a score of government research laboratories and half-a-dozen university departments. Though the major appeal of the exhibition was to physicists, it attracted—and instructed—many others concerned with the technical side of industry.

Detectors of atomic radiations and instruments for the measurement of the intensity of radiation were displayed on the stands of a number of manufacturers: many of these exhibits had been designed in collaboration with the Atomic Energy Research Establishment, Harwell. Artificially radioactive isotopes produced at Harwell are finding increasing applications in industry, particularly in the radiography of metal parts, and the Aeronautical Inspection Directorate, Ministry of Supply, exhibited a very neat container for such radioactive isotopes. This was designed to allow exposures to be made by an operator without danger from the radiations.

In one section of the exhibition the sounds of amplified music were to be heard. This was not an attempt to produce a lighter atmosphere but a demonstration of how a beam of infra-red light could be used as a means of carrying sound. The principle is similar to that in which sound is transmitted by radio-waves, the place of an electric valve as a modulator of the carrier vibrations being taken by a germanium crystal. Another exhibit in the same room was an apparatus for analyzing and

synthesizing speech designed not from an interest in phonetics, but from a desire to determine the minimum requirements for the transmission of intelligible speech.

The cathode ray tube long familiar to physicists has now become a household phenomenon. At the exhibition could be seen a tube with four separate electrode assemblies capable of presenting four simultaneous traces or pictures. The technical achievement of construction was more impressive than an adjacent exhibit capable of a more complex function but using seven separate cathode ray tubes, each with a face the size of a penny. Two firms displayed the projection of images from ordinary microscopes on to the screens of one, or more, cathode ray tubes. The method can be used in phase contrast microscopy, is more flexible in the number of separate displays possible and can give brighter images than established methods of optical projection.

The National Coal Board, a comparative newcomer among exhibitors, was responsible for seven exhibits. Most of these were of devices for measuring or controlling conditions in mines or for testing samples of coal and coal dust. One, however, was a piece of apparatus capable of simulating by electrical analogy very complicated ventilating systems. Variable sources of current correspond to fan pressure, networks of electrical resistors to underground roadways of various sizes and conformations and the flow of current to the flow of air. By use of this machine ventilation systems can be designed without the tedious solution of great numbers of mathematical equations, the only method previously available to mining engineers.

D. J. B. COPP

TWENTIETH CENTURY FORM EXHIBITION

The exhibition, Twentieth Century Form, now being held at the Whitechapel Art Gallery, is designed as a plain man's guide to certain aspects of modern art. It is hoped that a demonstration of the relationship between the architecture, painting and sculpture of this century may serve to illustrate the principles of modern art, and perhaps to induce its more sympathetic consideration by the man in the street.

Paintings and sculpture by French, Italian and English artists are displayed with models of British, and photographs of foreign, architecture.

The exhibition will be open until 31st May, on week-days, except Mondays, from 11 a.m. to 6 p.m., and on Sundays from 2 p.m. to 6 p.m. Admission is free.

CORRESPONDENCE

BRITISH INLAND WATERWAYS

From SIR REGINALD HILL, K.B.E., CHAIRMAN, DOCKS AND INLAND WATERWAYS EXECUTIVE
22, DORSET SQUARE, N.W.1.

I was surprised to see in your record of Mr. Aickman's paper entitled "British Inland Waterways To-day and To-morrow",* criticisms of the Docks and Inland Waterways Executive which were not included by the lecturer in presenting his paper. Had they been made at the time I should have dealt with them in the subsequent discussion, but as, by their omission, there was no opportunity of answering them and as they at present stand on record unchallenged and have received considerable publicity, I ask you to publish this letter in the interest of fair debate.

Mr. Aickman is reported as stating "The Executive is riddled with timidity, defeatism and impecuniosity". I propose to show that the application of these opprobrious terms is unwarranted.

Since they took over the inland waterways in 1948 the Executive have spent more than £7 million on rehabilitation and improvement, of which well over £1 million

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has been charged to central funds of the British Transport Commission for abnormal maintenance. Even so, the Commission has had to bear each year substantial deficits on the waterways account amounting to about £1¼ million in all. Is this fairly to be described as "impecuniosity", particularly at a time when rising prices and wages have seriously imperilled the financial position of the Commission? That the real position is recognized by those who are perhaps better informed of the facts is demonstrated by a recent letter to the *Birmingham Post* from the Chairman of the Midlands Branch of the Inland Waterways Association in which he referred to "the hard work and heavy expenditure of the Executive during the past few years in restoring the Black Country canals to their present generally excellent condition".

Mr. Aickman is evidently unaware of the organizations established by the Executive to secure additional traffic by canvassing and the provision of improved facilities, or of the steady encouragement given to the independent carriers by waterway, who own about four-fifths of the carrying fleet. When the largest of these carriers decided to go out of business and dispose of their craft the Executive, in order to ensure the retention of the facilities the Company provided, bought the fleet and have continued to operate it themselves. Is this defeatism?

As for timidity, a refusal to spend large sums on certain canals which, owing to the changed location and conditions of industry, can offer no prospect of yielding any commercial return, is, I suggest, more properly to be ascribed to reasonable prudence.

Mr. Aickman pleaded for greater use of the waterways by traders: yet he insists that the waterways account should bear the cost of restoring and maintaining canals which have long since ceased to carry any cargoes. With the choice of various means of transport traders will not be induced to use the waterways if they incur tolls and other charges swollen by having to cover the maintenance of canals they never use.

The policy of the Executive is to maintain, and where necessary improve, the considerable mileage of waterways which still have a commercial value as part of the national system of transport or have any prospect of recovering one. In this way, and on equipment for efficient performance of those services for which they are best fitted, expenditure on inland navigations may be profitable to the country and we are applying our resources accordingly. We are also using research to discover ways and means whereby the heavy costs of maintenance under present conditions may be reduced and methods of transport and handling adapted to current requirements of trade. A research station has been built and equipped, and I am hopeful that the results of investigation and experiment there will contribute substantially to fitting our waterways to play a larger part in the transport system of the country.

These, I submit, are practical measures; the pity is that by demanding the retention and restoration, at vast expense, of every mile of canal, whatever its condition or potential value, some of the advocates of waterways obscure the practical issues in an atmosphere of make-believe.

NOTE: The critical remarks referred to above were included in Mr. Aickman's original text, which was prepared for publication before his meeting. It is regretted that, these having been omitted in the largely extempore delivery of the paper, Sir Reginald had no occasion at the meeting to answer them. *Editor.*

MR. AICKMAN comments:

I should point out that I am particularly well informed of the recent welcome improvements on certain waterways in the Midlands, because last year I visited many of them, travelling over them, moreover, by water on a voyage of more than three hundred miles in all. There are hundreds of miles of waterway elsewhere which it is difficult or impossible to believe that the Docks and Inland Waterways

Executive have any intention of improving. Indeed, Sir Reginald himself does not claim otherwise. In case it is believed that the waterways rejected by implication in the last paragraph of Sir Reginald Hill's letter are minor and unimportant, it should be mentioned that, to judge by the course of events, they seem to include such a major artery as the Kennet and Avon Canal, eighty-six miles long, with locks measuring 73′ by 14′, and the only surviving navigation linking the Thames and the Severn; and, to take an example of a different kind, the Barnsley Canal, an entirely commercial waterway in an entirely industrial district, where the payment of compensation to possible users seems to be preferred to repair and re-opening.

The Executive's salesmanship, if any, is, I still maintain, confined to certain specific navigations. Once more there are many hundreds of miles of waterway in all parts of the country for which the Executive makes no serious attempt to procure traffic. Sometimes, indeed, the Executive will provide no facilities for traffic which offers on its own account. But this is a question which need not be argued. Those in doubt should make the attempt to carry by water.

The procedure by which traders can be led into raising no objection to the destruction of an entire alternative means of transport by the offer of lower rates by rail and road, is one which has contributed largely to the present condition of the inland waterways system. All who have studied the reports of the various public enquiries into inland waterway transport will agree that it is a procedure which is dubiously in the national interest. It is true that at present the canal official who loses trade to the railway, is apt to reply "Oh well, it's all in the family"; but it is doubtful whether this attitude is in the national interest either.

Writing from a different and more limited point of reference, Sir Reginald overlooks the principal suggestion contained in my Paper: that as the waterways have many other functions than commercial carriage (important though it is that this should be greatly increased), their ultimate control should be in the hands of a National Waterways Commission upon which *all* the different interests would be represented. It is comparatively easy to suggest that specific waterways, considered in isolation and in relation only to a single specific function, cannot "be made to pay." If all the functions of all the waterways are considered cumulatively and constructively, little case will emerge for destroying any of them.

SHORT NOTES ON BOOKS

PAINTING TREES AND LANDSCAPES IN WATERCOLOUR. *By Ted Kautzky. New York, Reinhold publishing corporation*, 1952.

Chapters on materials, composition and technique are followed by colour reproductions of paintings showing different trees and different types of landscape. Each of these is accompanied by a number of monochrome sketches showing the way in which the picture was composed and certain details represented.

WORLD COSTUMES. *By Angela Bradshaw. Adam and Charles Black*, 1952. 40*s*

This is a series of large clear plates, some in colour, showing characteristic costumes of seventy-nine countries, a number of ancient costumes, and English costume from 1350 to 1900. Each plate is briefly annotated, and there are details of embroideries and of head-dresses.

CHILD ART GROWS UP. *By Kenneth Holmes and Hugh Collinson. Studio publications*, 1952. 18*s*

The place of art in the school is here studied both as it is and as it might be; the appreciation and the practice of the arts are considered as part of the child's education, and as an enrichment of his after-school life.

FROM THE JOURNAL OF 1853

VOLUME 1. *6th May*, 1853

From the report of the discussion which followed the reading by the Very Rev. the Dean of Hereford *of a paper* On the Importance of giving a Self-supporting Character, as far as possible, to Schools for the Labouring Classes; and the Means of doing so.

HENRY COLE, ESQ., C.B., ... It had been his business, during the last year, to be connected with the Government schools of design, supported upon the principle of Government paying part, and begging for the remainder. An examination of the progress of these institutions showed that the results were not successful. It was found that in proportion as the Government was disposed to contribute, committees were disposed to inaction; that where the Government paid much, the localities did little. Last year the Board of Trade endeavoured to introduce a more wholesome state of things, and it was determined that no further schools should be founded on the principle of the Government subsidizing them. At that time two schools were about to be founded, which afforded a very fair experiment. One was in Limerick and the other in Waterford; both were cities in the county of Limerick, and both were agricultural towns, but Limerick contained about treble the population of Waterford. To the former £1,501 per annum had been promised, to Waterford nothing. Now the result of the experiment at the end of one year was as follows: the number of students in each was about the same, but in Limerick the students cost, per individual per annum, 32*s*., and paid per annum 25*s*.; whilst in Waterford they cost 15*s*. per individual, and paid 25*s*. Thus Waterford, a poor Irish town, was self-supporting, more so than any other in the country; whilst in Limerick, a richer town, with a larger population, the result of their subsidizing was to make them paupers and keep them so. Limerick was constantly begging for more, whilst Waterford, having nothing to gain by begging, depended on its own resources. In consequence of the success of Waterford, education in art had been extended to other places on the same principle of not giving any subsidy, but guaranteeing an income to the master.

Some Meetings of Other Societies

MON. 4 MAY. Geographical Society, Royal, S.W.7. 5 p.m. P. de Bethune : *Appalachian Relief.*

TUES. 5 MAY. Electrical Engineers, Institution of, Savoy Place, W.C.2. 5.30 p.m. J. Z. Young : *Measurement with the Flying-Spot Microscope.*

THURS. 7 MAY. Electrical Engineers, Institution of, Savoy Place, W.C.2. L. J. Davies : *Research in the Electrical Manufacturing Industry.*

Modular Society, at the Royal Society of Arts, W.C.2. 7.30 p.m. *Modular Coordination* (Discussion).

Photographic Society, Royal, S.W.7. 7 p.m. N. K. Harrison : *Apparatus Improvization in Medical Photography.*

SAT. 9 MAY. Chemical Engineers, Institution of, at the University, Edmund Street, Birmingham. 3 p.m. K. Burrow : *The Continuous Hydrolysis of Fats.*

MON. 11 MAY. Geographical Society, Royal, S.W.7. 8.15 p.m. J. A. Steers : *The East Anglian Floods.*

WED. 13 MAY. Petroleum, Institute of, 26, Portland Place, W.1. 5.30 p.m. V. F. H. Samson : *Mechanical Handling in the Petroleum Industry.*

FRI. 15 MAY. Geographical Society, Royal, S.W.7. 5 p.m. G. E. R. Deacon and G. S. Ritchie : *Navigation and Oceanography.*